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ABSTRACT

In response to the federal goal to connect all of the nation's school classrooms, libraries, hospitals, and law enforcement agencies to the information superhighway, the Department of Education commissioned a survey to obtain baseline data on the status of advanced telecommunications in public elementary and secondary schools. Data was gathered from a nationally representative sample of 1,380 schools regarding the types and location of advanced telecommunications equipment; services currently available; current computer networking capabilities; plans to implement or upgrade wide area networks; sources of such plans and of the school's budgetary decisions for telecommunications technology; and the various barriers that limit acquisition or use of advanced telecommunications. This report contains tabular summaries (16 data tables and 15 standard error tables in an appendix) that highlight selected findings based on the data collected. The tables in this report present data for public schools and for schools by instructional level, size of enrollment, metropolitan status, and geographic region of the country. The survey instrument is appended. Contains three references. (MAS)

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Advanced Telecommunications in U.S. Public Schools, K-12

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February 1995

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Introduction

The National Information Infrastructure (NII), set forth by the President, encourages an acceleration of the goal to connect all of the nation's school classrooms, as well as libraries, hospitals, and law enforcement agencies to the "Information Superhighway."

In response to this federal goal, the Department of Education, in cooperation with the Department of Commerce, commissioned a survey to obtain baseline data on the status of advanced telecommunications in public elementary and secondary schools. The survey requested information regarding the types of advanced telecommunications equipment and services that are currently available in public schools and the specific locations of the equipment; current computer networking capabilities in public schools; the number of schools that have plans to connect to wide area networks; the sources of their plans and of the schools' budgetary decisions for telecommunications technology; and the various barriers that limit schools' acquisition or use of advanced telecommunications.

This E.D. TABS report contains tabular summaries based on data collected from the *Survey of Advanced Telecommunications in U.S. Public Schools, K-12*, conducted for the National Center for Education Statistics (NCES). E.D. TABS are a collection of tables whose sole purpose is to make data or tables available to the general and research public quickly. E.D. TABS are not intended to present analyses of the data from the survey. The tabular summaries present the actual data collected and only selected findings are highlighted in this report.

The tables in this report present data for public schools and for schools by instructional level (elementary, secondary), size of enrollment (less than 300, 300-999, 1,000 or more), metropolitan status (city, urban fringe, town, rural) and geographic region of the country (northeast, southeast, central, west). The statistics in all tables are based on national estimates (see table 1). Any statement of comparison made in this report has been tested for statistical significance through chi-square tests or *t*-tests adjusted for multiple comparisons using the Bonferroni adjustment and are significant at the .05 level or better.

The survey was conducted by Westat, Inc., a research firm in Rockville, Maryland, through the NCES Fast Response Survey System (FRSS). FRSS was designed to provide data quickly on policy-related issues regarding emerging educational developments.

The data from this survey provide valuable information that federal agencies will use to determine the magnitude of the tasks and activities required to help our nation's public schools obtain and use telecommunications technology. Additional, in-depth reports containing detailed analyses of the findings from the survey are forthcoming.

Selected Findings

The Survey of Advanced Telecommunications in U.S. Public Schools, K-12 requested information regarding the availability and use of telecommunications, plans to implement or upgrade wide area connections, access to the Internet and selected Internet capabilities, and barriers schools face to the acquisition or use of advanced telecommunications. The data were gathered from a nationally representative sample of 1,380 public elementary and secondary schools in fall 1994.

- Overall, 35 percent of public schools have access to the Internet but only 3 percent of all instructional rooms (classrooms, labs and media centers) in public schools are connected to the Internet. Only 30 percent of public elementary schools have Internet access compared with 49 percent for secondary schools (table 5).

- Funding is the major barrier most often cited in the acquisition or use of advanced telecommunications in public schools. Schools cited funding as a major barrier 69 percent of the time which ranks first in a list of potential barriers (table 14). Other major barriers most often cited were lack of equipment or poor equipment (50 percent) and too few access points in the school building (47 percent).

- Seventy-five percent of public schools have computers with some type of telecommunication capabilities (i.e., local area networks or wide area networks), 74 percent have cable television, and 70 percent have access to broadcast television in their schools (table 2).

- Only 40 percent of public schools having computers with telecommunication capabilities indicated that they were located in classrooms (table 2). However, the types of telecommunications most often located in classrooms are broadcast television and cable television. Although 94 percent of schools with closed-circuit television reported it was in classrooms, only 25 percent of schools had this capability.

- While 75 percent of public schools have access to some kind of computer network, only 49 percent have access to a wide area network--35 percent of public schools have access to the Internet and 14 percent have access to other wide area networks (e.g., CompuServe, America Online, Prodigy; table 3).

- Sixty-seven percent of public schools have plans to implement or upgrade a wide area computer network (table 4). Of these, 81 percent indicate that their telecommunications plans are part of a district-level plan, 48 percent are part of a school-based plan, 27 percent are part of a state plan, and 19 percent are part of a regional plan.

- In the Southeast, schools are about twice as likely to report statewide telecommunications plans than schools in the other regions of the country--41 percent for the Southeast as compared with 20, 22, or 26 percent in the other regions (table 4).

- Smaller schools with enrollments of less than 300 are less likely to be on the Internet than schools with larger enrollment sizes. Only 30 percent of small schools reported having Internet access, while 58 percent of schools with enrollments of 1,000 or more reported having Internet access (table 5).

For the 35 percent of public schools having access to the Internet:

- E-mail is the most widely available Internet capability. Ninety percent of schools on the Internet indicate E-mail is available at their school (table 6). News groups and resource location services (Gopher, Archie, Veronica, etc.) are available in 64 and 62 percent of the schools, respectively. Only 21 percent of the schools report having some graphical user interface capabilities such as MOSAIC.

- Each of these Internet capabilities (E-mail, news groups, resource location services, and graphical user interface) is more often available for teachers and administrative staff than for students. Eighty-five to 94 percent of schools with Internet access indicated availability for teachers and 66 to 79 percent indicated availability for administrative staff as compared to 43 to 54 percent of schools reporting that the capabilities were available for students (table 6).

- The number of instructional rooms connected to the Internet varies greatly--51 percent of the schools with Internet have a connection in one instructional room, 27 percent have connections in two or three instructional rooms, 5 percent have connections in four instructional rooms and 8 percent have connections in five or more instructional rooms (table 7).

For the 49 percent[1] of public schools having access to the Internet or any other wide area network connection:

- Eleven percent of the schools having access to wide area networks indicate that administrative staff use those networks to a large extent but only 3 percent indicate that students and 2 percent indicate that teachers use the network to a large extent (table 11).

- The overwhelming majority of schools that are connected to any wide area network use modems (97 percent; table 8).

- The responsibility for administering the wide area networks in 51 percent of the schools is assigned to a part-time network administrator (table 9). Only 9 percent of the schools indicate that the person responsible for administering the network is a full-time network administrator. Sixteen percent indicate that someone from the district staff administers their network and 24 percent report that no single individual is responsible.

- Large schools (enrollment of 1,000 or more) are about twice as likely to have a full-time network administrator than smaller schools--17 percent as compared to 7 or 9 percent (table 9).

- About 70 percent of schools having access to wide area networks provide training to the administrative staff and teachers. This training is provided more often by the school district than by the schools (table 10). Training for students also is provided in about half of the schools and for parents in 20 percent of schools. However, training for students and parents is more often provided by the school rather than the district.

- Schools with access to wide area networks indicate that district and regional administrators (48 percent) and teachers and other staff (33 percent) are the two groups most likely to play a large formal role in developing the school's telecommunications program (table 12).

- According to 89 percent of schools with wide area network access, decisions concerning the school's telecommunications budget are made most frequently by the school district (table 13). Fifty-nine percent also report that their school is responsible for making decisions concerning the telecommunications budget. Only 22 percent of schools indicated state influence on these budget decisions and 15 percent indicated that their regional administrator was responsible for making decisions on the school's telecommunications budget.

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[1]The estimated percent of schools having access to the Internet or any other wide area network connection--49 percent of public schools--is based upon a variable which was derived from two items on the questionnaire. It is an unduplicated count of those schools indicating that they have access to either the Internet or any other wide area network (e.g., CompuServe, America Online, Prodigy; table 3).

Table 1.--Number and percent of responding public schools in the study sample and estimated number and percent of public schools the sample represents, by school characteristics: 1994

School characteristic	Respondents sample		National estimate	
	Number	Percent	Number	Percent
All public schools	1,380	100	77,649	100
Instructional level				
Elementary	688	50	57,500	74
Secondary	640	46	18,362	24
Combined	52	4	1,787	2
Size of enrollment				
Less than 300	231	17	21,350	28
300 to 999	845	61	49,470	64
1,000 or more	304	22	6,829	9
Metropolitan status				
City	334	24	18,379	24
Urban fringe	356	26	18,753	24
Town	366	27	19,397	25
Rural	324	24	21,120	27
Geographic region				
Northeast	260	19	14,768	19
Southeast	326	24	16,595	21
Central	380	28	23,037	30
West	414	30	23,249	30

NOTE: Percents may not sum to 100 because of rounding, and details may not add to totals because of rounding for weighted estimates.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 2.--Percent of public schools having access to selected telecommunication capabilities and the specific location of telecommunications within the school, by capability: 1994

Telecommunication capabilities	Percent of schools having access	Percent of schools reporting their telecommunications locations				
		Administrative offices	Teacher workrooms	Class-rooms	Computer labs	Library/ media centers
Computer with any telecommunication capabilities (i.e., local area network or wide area network)	75	71	15	40	55	62
Broadcast TV	70	36	31	83	41	84
Cable TV	74	31	24	70	39	85
Closed circuit TV	25	49	31	94	59	89
Two-way video with two-way audio	6	27	14	63	21	61
One-way video with two-way audio or computer link	10	28	14	58	36	67

NOTE: Percents of schools reporting telecommunications locations do not sum to 100 because many schools reported access in more than one location. Location estimates are based on those schools that have access to each type of telecommunication capability.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 3.--Percent of public schools having access to various types of computer networks: 1994

Type of computer network access	Percent of schools having access to computer networks
Any type of computer network (i.e., local area network or wide area network)	75
Local area network	26
Wide area network	49
Internet	35
Other wide area network (e.g., CompuServe, America Online, Prodigy)	14

NOTE: Definitions for types of networks presented in this table are contained in the glossary--Appendix B.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 4.--Percent of public schools indicating they have plans to implement or upgrade a wide area computer network and the percent indicating the sources of their plans, by school characteristics: 1994

School characteristic	Plans for wide area network	Sources of plans				
		School	District	Regional	State	Other
All public schools	67	48	81	19	27	4
Instructional level*						
Elementary	65	45	83	17	26	4
Secondary	74	58	74	22	29	4
Size of enrollment						
Less than 300	60	44	79	22	32	8
300 to 999	69	49	81	17	25	3
1,000 or more	80	53	85	18	25	5
Metropolitan status						
City	67	54	78	9	21	4
Urban fringe	65	38	86	17	20	3
Town	71	48	82	23	31	3
Rural	65	52	77	24	33	6
Geographic region						
Northeast	70	48	79	18	22	4
Southeast	66	51	74	15	41	3
Central	66	45	84	19	26	6
West	67	49	83	21	20	4

*Data for combined schools are not reported as a separate instructional level because there are very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents do not sum to 100 because many schools reported multiple plans. Sources of plans estimates are based upon those schools that have plans to implement or upgrade a wide area computer network.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

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Table 5.--Percent of public schools having access to the Internet and the percent of all instructional rooms across the country with an Internet connection, by school characteristics: 1994

School characteristic	Percent of schools having access to the Internet	Percent of all instructional rooms across the country with Internet access[1]
All public schools	35	3
Instructional level[2]		
Elementary	30	3
Secondary	49	4
Size of enrollment		
Less than 300	30	3
300 to 999	35	3
1,000 or more	58	3
Metropolitan status		
City	40	4
Urban fringe	38	4
Town	29	3
Rural	35	3
Geographic region		
Northeast	34	3
Southeast	29	2
Central	34	3
West	42	5

[1]The percent of instructional rooms across the country is based upon the total number of instructional rooms (e.g., classrooms, computer labs, library/media centers) in all regular public elementary and secondary schools.

[2]Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 6.--Percent of public schools having access to the Internet, by various types of Internet capabilities and for whom in the school community the capability is available: 1994

Internet capabilities	Available[1]	Members of school community[2]		
		Administrative staff	Teachers	Students
E-mail	90	79	85	43
News groups	64	70	94	52
Resource location services (e.g., Gopher, Archie, Veronica, etc.)	62	72	92	52
Graphical user interface (e.g., MOSAIC)	21	66	91	54

[1]Percents in this column are based upon the number of schools having access to the Internet--35 percent of public schools.

[2]Percents in these columns are based upon the number of schools with each Internet capability.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 7.--Percent of public schools having access to the Internet by the number and mean number of instructional rooms connected to the Internet, by school characteristics: 1994

School characteristic	Number of instructional rooms					Mean number of instructional rooms
	0 rooms	1 room	2-3 rooms	4 rooms	5 or more rooms	
All public schools	9	51	27	5	8	2.9
Instructional level*						
Elementary	11	52	25	4	7	2.5
Secondary	6	47	32	6	9	3.5
Size of enrollment						
Less than 300	12	51	24	7	6	1.9
300 to 999	9	51	28	4	9	3.1
1,000 or more	6	50	29	5	10	3.7
Metropolitan status						
City	11	48	28	3	9	3.2
Urban fringe	6	51	29	4	10	3.4
Town	6	57	24	6	7	3.0
Rural	13	47	26	6	7	2.0
Geographic region						
Northeast	6	55	27	2	9	2.4
Southeast	7	55	31	3	4	2.1
Central	13	48	29	6	5	2.8
West	9	48	24	6	12	3.6

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to the Internet--35 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 8.--Percent of public schools having access to any wide area network, by type of connection and by school characteristics: 1994

School characteristic	Type of connection				
	Modem	T1	56Kb	SLIP/PPP	Other
All public schools	97	3	4	3	4
Instructional level*					
Elementary	97	2	3	2	3
Secondary	97	3	5	5	4
Size of enrollment					
Less than 300	97	2	2	1	2
300 to 999	97	3	4	3	4
1,000 or more	96	3	5	7	4
Metropolitan status					
City	97	5	3	3	4
Urban fringe	96	3	4	2	5
Town	98	1	4	5	3
Rural	97	1	4	3	3
Geographic region					
Northeast	98	2	4	2	2
Southeast	98	1	1	1	4
Central	96	1	4	5	4
West	97	6	5	3	5

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents do not sum to 100 because some schools reported more than one type of connection. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 9.--Percent of public schools having access to any wide area network, by type of network administrator and by school characteristics: 1994

School characteristic	Type of administrator			
	Full-time network administrator	Part-time network administrator	District staff	No single individual
All public schools	9	51	16	24
Instructional level*				
Elementary	9	50	17	24
Secondary	10	53	14	23
Size of enrollment				
Less than 300	7	60	17	17
300 to 999	9	49	16	27
1,000 or more	17	47	16	20
Metropolitan status				
City	7	44	18	31
Urban fringe	11	47	16	26
Town	10	53	16	21
Rural	9	60	13	17
Geographic region				
Northeast	7	48	20	25
Southeast	16	43	15	27
Central	10	60	12	18
West	6	50	17	26

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 10.--Percent of public schools having access to any wide area network with training provisions, by recipient of training and by source of training: 1994

Recipient of training	Training[1] provided	Source of training[2]		
		School	District	Community
Administrative staff	70	35	73	11
Teachers	71	46	63	14
Students	52	85	21	2
Parents	20	58	36	17

[1]Percents in this column are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

[2]Percents in these columns are based upon the number of schools that have access to training.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 11.--Percent of public schools having access to any wide area network by the extent of use by members of the school community, by school characteristics: 1994

School characteristic	Members of the school community								
	Administrative staff			Teachers			Students		
	Small or no extent	Moderate extent	Large extent	Small or no extent	Moderate extent	Large extent	Small or no extent	Moderate extent	Large extent
All public schools	74	16	11	79	19	2	83	14	3
Instructional level*									
Elementary	74	15	11	78	20	2	82	15	3
Secondary	72	17	11	79	18	2	82	15	3
Size of enrollment									
Less than 300	84	10	7	73	26	1	82	16	1
300 to 999	71	17	12	81	16	3	82	13	4
1,000 or more	66	19	14	78	19	3	84	15	1
Metropolitan status									
City	62	20	18	76	22	2	83	13	4
Urban fringe	73	17	10	81	15	4	81	16	3
Town	79	12	10	79	18	3	81	16	3
Rural	81	13	6	80	20	1	84	13	3
Geographic region									
Northeast	75	11	14	79	17	4	79	18	3
Southeast	82	14	4	77	21	1	81	13	6
Central	76	16	8	83	16	1	85	14	1
West	65	19	16	76	21	3	84	13	3

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

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Table 12.--Percent of public schools having access to any wide area network by the extent of the formal role in developing the school's telecommunications program, by various groups: 1994

Various groups	Small or no extent	Moderate extent	Large extent
Students	91	8	2
Teachers/staff	33	35	33
Parents	79	17	4
District/regional administrators	26	26	48
Business leaders	84	12	4
Institutions of higher education	81	14	5
Community organizations	88	8	4
State education agency	66	21	13

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 13.--Percent of public schools having access to any wide area network by the sources of decision making concerning the school's advanced telecommunications budget, by school characteristics: 1994

School characteristic	Sources of decision making			
	School	District	Regional administrator	State
All public schools	59	89	15	22
Instructional level*				
Elementary	58	89	15	22
Secondary	60	88	15	23
Size of enrollment				
Less than 300	53	89	15	17
300 to 999	59	88	15	23
1,000 or more	66	90	14	26
Metropolitan status				
City	62	88	15	22
Urban fringe	62	90	11	19
Town	58	83	22	28
Rural	52	92	12	22
Geographic region				
Northeast	53	91	15	14
Southeast	61	87	17	35
Central	57	88	16	18
West	62	89	13	24

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents do not sum to 100 because many schools reported budget decisions made by more than one source. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 14.--Percent of all public schools indicating the extent to which various factors are barriers to either the acquisition or the use of advanced telecommunications: 1994

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	30	20	50
Inadequate hardware upkeep and repair	50	22	28
Lack of instructional software	47	28	24
Software too complicated to use	79	14	7
Too few access points in building	35	19	47
Telecommunications equipment not easily accessible	36	20	44
Telecommunications links not easily accessible	42	18	39
Variability of telecommunications rates from service providers	64	17	19
Problems with telecommunications service provider	78	9	13
Lack of time in school schedule	45	27	28
Lack of technical support or advice	46	27	27
Use of advanced telecommunications does not fit with the educational policy of this school	90	6	4
Lack of or inadequately trained staff	33	31	36
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	32	34	34
Not enough help for supervising student computer use	49	26	25
Lack of administrative support or initiative	69	17	14
Lack of teacher interest	65	28	8
Lack of parent or community interest	77	16	7
Lack of student interest	92	6	2
Funds not specifically allocated for telecommunications	16	15	69

NOTE: Percents may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 15.--Percent of public schools currently having access to any wide area network by the extent to which various factors are barriers to upgrading or maximizing the use of their advanced telecommunication capabilities: 1994

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	32	20	48
Inadequate hardware upkeep and repair	56	21	23
Lack of instructional software	50	29	21
Software too complicated to use	79	16	6
Too few access points in building	28	21	52
Telecommunications equipment not easily accessible	37	25	39
Telecommunications links not easily accessible	42	22	36
Variability of telecommunications rates from service providers	64	16	20
Problems with telecommunications service provider	80	10	10
Lack of time in school schedule	33	32	35
Lack of technical support or advice	43	32	25
Use of advanced telecommunications does not fit with the educational policy of this school	92	5	3
Lack of or inadequately trained staff	31	32	37
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	26	39	35
Not enough help for supervising student computer use	48	28	24
Lack of administrative support or initiative	69	17	14
Lack of teacher interest	61	31	8
Lack of parent or community interest	78	17	5
Lack of student interest	92	6	2
Funds not specifically allocated for telecommunications	19	18	63

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 16.--Percent of public schools that do not currently have access to any wide area network by the extent to which various factors are barriers to their acquisition of advanced telecommunication capabilities: 1994

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	28	20	52
Inadequate hardware upkeep and repair	44	23	34
Lack of instructional software	45	28	28
Software too complicated to use	80	11	8
Too few access points in building	41	17	42
Telecommunications equipment not easily accessible	35	16	49
Telecommunications links not easily accessible	43	14	43
Variability of telecommunications rates from service providers	65	17	18
Problems with telecommunications service provider	77	8	15
Lack of time in school schedule	57	22	20
Lack of technical support or advice	48	23	29
Use of advanced telecommunications does not fit with the educational policy of this school	88	7	5
Lack of or inadequately trained staff	36	30	34
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	37	30	33
Not enough help for supervising student computer use	50	23	27
Lack of administrative support or initiative	70	17	14
Lack of teacher interest	68	24	8
Lack of parent or community interest	76	16	8
Lack of student interest	91	6	3
Funds not specifically allocated for telecommunications	13	13	74

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools that do not have access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--51 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

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Appendix A

Standard Error Tables

Table 2a.--Standard error of the percent of public schools having access to selected telecommunication capabilities and the specific location of telecommunications within the school, by capability: 1994

Telecommunication capabilities	Percent of schools having access	Percent of schools reporting their telecommunications locations				
		Administrative offices	Teacher workrooms	Class-rooms	Computer labs	Library/ media centers
Computer with any telecommunication capabilities (i.e., local area network or wide area network)	1.5	1.4	1.2	1.6	1.7	1.9
Broadcast TV	1.6	1.8	1.8	1.1	2.0	1.7
Cable TV	1.3	1.6	1.7	1.5	1.7	1.3
Closed circuit TV	1.4	2.6	2.3	1.4	2.4	1.6
Two-way video with two-way audio	0.7	6.3	3.8	6.6	4.2	7.3
One-way video with two-way audio or computer link	0.9	4.3	2.8	4.4	5.1	3.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 3a.--Standard error of the percent of public schools having access to various types of computer networks: 1994

Type of computer network access	Percent of schools having access to computer networks
Any type of computer network (i.e., local area network or wide area network)	1.5
Local area network	1.5
Wide area network	1.5
Internet	1.5
Other wide area network (e.g., CompuServe, America Online, Prodigy)	1.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 4a.--Standard error of the percent of public schools indicating they have plans to implement or upgrade a wide area computer network and the percent indicating the sources of their plans, by school characteristics: 1994

School characteristic	Plans for wide area network	Sources of plans				
		School	District	Regional	State	Other
All public schools	1.8	1.9	1.4	1.3	1.4	0.9
Instructional level						
Elementary	2.3	2.6	1.8	1.6	2.0	1.2
Secondary	1.8	2.1	2.3	2.4	1.9	1.2
Size of enrollment						
Less than 300	3.7	4.4	3.8	3.6	4.2	2.7
300 to 999	2.0	2.2	1.7	1.4	1.7	0.6
1,000 or more	2.6	3.9	2.5	3.7	3.4	1.6
Metropolitan status						
City	3.3	4.2	3.1	2.0	2.9	1.4
Urban fringe	2.9	3.3	2.3	2.1	3.1	1.3
Town	2.6	4.1	1.8	3.3	3.1	1.4
Rural	3.4	3.7	3.8	3.1	4.0	2.5
Geographic region						
Northeast	3.5	4.0	3.2	2.5	3.0	1.5
Southeast	3.4	3.8	3.3	2.4	3.7	1.2
Central	3.0	2.6	2.8	2.5	2.9	2.0
West	2.8	3.6	2.6	2.9	3.2	1.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994

Table 5a.--Standard error of the percent of public schools having access to the Internet and the percent of all instructional rooms across the country with an Internet connection, by school characteristics: 1994

School characteristic	Percent of schools having access to the Internet	Percent of all instructional rooms across the country with Internet access
All public schools	1.5	0.3
Instructional level		
Elementary	1.9	0.4
Secondary	2.4	0.6
Size of enrollment		
Less than 300	3.4	0.7
300 to 999	2.0	0.5
1,000 or more	3.0	0.6
Metropolitan status		
City	3.1	0.8
Urban fringe	2.9	0.8
Town	2.3	0.6
Rural	2.7	0.4
Geographic region		
Northeast	3.1	0.7
Southeast	3.1	0.3
Central	2.8	0.8
West	2.6	0.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 6a.--Standard error of the percent of public schools having access to the Internet, by various types of Internet capabilities and for whom in the school community the capability is available: 1994

Internet capabilities	Available	Members of school community		
		Administrative staff	Teachers	Students
E-mail	1.4	1.8	1.8	2.8
News groups	2.9	2.5	1.3	3.1
Resource location services (e.g., Gopher, Archie, Veronica, etc.)	2.7	2.5	1.7	3.4
Graphical user interface (e.g., MOSAIC)	1.5	5.3	2.8	6.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 7a.--Standard error of the percent of public schools having access to the Internet by the number and mean number of instructional rooms connected to the Internet, by school characteristics: 1994

School characteristic	Number of instructional rooms					Mean number of instructional rooms
	0 rooms	1 room	2-3 rooms	4 rooms	5 or more rooms	
All public schools	1.9	2.6	2.3	1.1	1.3	0.3
Instructional level						
Elementary	3.0	3.6	2.9	1.5	1.7	0.3
Secondary	1.8	3.3	2.8	1.6	1.5	0.5
Size of enrollment						
Less than 300	4.5	5.7	5.4	3.6	2.5	0.3
300 to 999	2.4	3.6	2.6	1.1	1.6	0.4
1,000 or more	1.9	4.0	3.8	1.6	1.9	0.7
Metropolitan status						
City	3.5	4.7	3.7	1.5	2.7	0.7
Urban fringe	3.1	5.1	4.7	2.0	2.5	0.7
Town	2.7	5.4	3.9	2.2	2.4	0.7
Rural	3.9	5.4	4.0	3.2	2.5	0.3
Geographic region						
Northeast	3.3	5.5	5.2	0.9	3.0	0.6
Southeast	2.6	6.7	6.4	1.2	1.6	0.4
Central	4.0	4.2	4.2	2.9	1.8	0.7
West	2.6	4.3	3.1	1.9	3.0	0.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 8a.--Standard error of the percent of public schools having access to any wide area network, by type of connection and by school characteristics: 1994

School characteristic	Type of connection				
	Modem	T1	56Kb	SLIP/PPP	Other
All public schools	0.7	0.8	0.7	0.6	0.8
Instructional level					
Elementary	0.9	1.0	1.0	0.9	1.1
Secondary	1.0	0.8	1.1	1.0	1.1
Size of enrollment					
Less than 300	1.6	1.2	1.4	0.6	1.0
300 to 999	0.9	1.0	1.0	0.8	1.2
1,000 or more	1.3	1.2	1.5	1.7	1.4
Metropolitan status					
City	1.5	1.8	1.3	1.3	1.6
Urban fringe	1.5	1.4	1.5	0.9	1.6
Town	1.2	0.6	1.3	1.7	1.5
Rural	1.3	0.9	1.6	1.3	1.1
Geographic region					
Northeast	1.2	0.8	1.6	1.4	1.3
Southeast	1.7	0.5	0.9	0.8	2.5
Central	1.4	0.6	1.3	1.4	1.3
West	1.3	1.9	1.4	1.0	1.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 9a.--Standard error of the percent of public schools having access to any wide area network, by type of network administrator and by school characteristics: 1994

School characteristic	Type of administrator			
	Full-time network administrator	Part-time network administrator	District staff	No single individual
All public schools	1.0	2.3	1.7	2.0
Instructional level				
Elementary	1.5	3.1	2.4	2.8
Secondary	1.4	2.4	1.7	2.1
Size of enrollment				
Less than 300	2.4	5.0	4.6	3.9
300 to 999	1.3	2.9	2.0	2.5
1,000 or more	2.6	4.0	2.4	2.6
Metropolitan status				
City	2.6	4.0	3.6	4.2
Urban fringe	2.1	3.6	2.6	3.5
Town	2.2	5.1	3.7	3.5
Rural	2.5	4.4	2.2	2.9
Geographic region				
Northeast	2.2	4.7	4.1	4.2
Southeast	2.9	5.1	4.0	3.9
Central	2.1	4.2	2.8	3.1
West	1.8	4.5	2.7	3.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 10a.--Standard error of the percent of public schools having access to any wide area network with training provisions, by recipient of training and by source of training: 1994

Recipient of training	Training provided	Source of training		
		School	District	Community
Administrative staff	2.4	2.5	2.5	1.8
Teachers	2.1	2.7	2.6	2.0
Students	2.2	2.4	2.6	0.8
Parents	1.7	4.7	4.6	3.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 11a.--Standard error of the percent of public schools having access to any wide area network by the extent of use by members of the school community, by school characteristics: 1994

School characteristic	Members of the school community								
	Administrative staff			Teachers			Students		
	Small or no extent	Moderate extent	Large extent	Small or no extent	Moderate extent	Large extent	Small or no extent	Moderate extent	Large extent
All public schools	1.7	1.6	1.2	1.9	1.8	0.5	1.7	1.4	0.7
Instructional level									
Elementary	2.6	2.4	1.6	2.5	2.4	0.8	2.4	2.1	0.9
Secondary	2.8	2.0	1.8	2.5	2.5	0.7	2.1	1.9	0.9
Size of enrollment									
Less than 300	3.6	2.5	2.6	5.4	5.5	1.1	4.6	4.3	0.8
300 to 999	2.4	1.9	1.8	1.8	1.8	0.8	2.0	1.6	0.9
1,000 or more	3.5	2.7	2.3	3.1	2.8	1.1	2.6	2.7	0.7
Metropolitan status									
City	3.8	3.5	3.1	3.4	3.4	1.3	3.4	3.1	1.6
Urban fringe	3.7	3.4	2.4	2.9	2.6	1.6	3.1	2.8	1.4
Town	3.8	2.5	2.6	4.2	4.2	1.2	3.5	3.6	1.2
Rural	2.8	2.5	1.7	3.9	4.0	0.4	3.5	3.1	1.2
Geographic region									
Northeast	4.1	3.0	3.5	4.2	3.8	1.9	4.4	4.1	1.4
Southeast	3.1	2.8	2.2	4.5	4.5	0.7	4.0	3.1	2.6
Central	3.1	2.7	2.0	3.4	3.4	0.8	3.0	3.0	0.8
West	3.7	3.2	2.7	3.5	3.4	1.1	2.6	2.5	1.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 12a.--Standard error of the percent of public schools having access to any wide area network by the extent of the formal role in developing the school's telecommunications program, by various groups: 1994

Various groups	Small or no extent	Moderate extent	Large extent
Students	1.3	1.2	0.5
Teachers/staff	1.9	1.8	2.0
Parents	2.1	1.9	0.7
District/Regional administrators	1.8	1.7	1.8
Business leaders	1.8	1.5	1.0
Institutions of higher education	1.5	1.4	0.9
Community organizations	1.3	1.0	0.7
State education agency	2.3	1.9	1.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 13a.--Standard error of the percent of public schools having access to any wide area network by the sources of decision making concerning the school's advanced telecommunications budget, by school characteristics: 1994

School characteristic	Sources of decision making			
	School	District	Regional administrator	State
All public schools	2.1	1.2	1.5	1.3
Instructional level				
Elementary	2.9	1.8	2.2	2.0
Secondary	2.6	1.7	2.1	2.0
Size of enrollment				
Less than 300	5.3	2.7	4.3	4.2
300 to 999	2.5	1.6	1.6	2.0
1,000 or more	3.6	2.2	2.8	3.4
Metropolitan status				
City	4.4	2.7	3.0	3.5
Urban fringe	4.6	2.1	2.6	3.1
Town	4.9	3.6	4.1	4.4
Rural	4.2	2.3	2.9	3.3
Geographic region				
Northeast	4.4	2.7	3.8	3.5
Southeast	4.5	2.8	3.4	4.8
Central	4.0	2.4	3.1	3.0
West	3.7	1.9	2.2	3.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 14a.--Standard error of the percent of all public schools indicating the extent to which various factors are barriers to either the acquisition or the use of advanced telecommunications: 1994

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	1.4	1.1	1.3
Inadequate hardware upkeep and repair	1.7	1.2	1.5
Lack of instructional software	1.5	1.4	1.4
Software too complicated to use	1.3	1.2	0.7
Too few access points in building	1.6	1.1	1.4
Telecommunications equipment not easily accessible	1.7	1.3	1.6
Telecommunications links not easily accessible	1.5	1.4	1.6
Variability of telecommunications rates from service providers	1.3	1.2	1.1
Problems with telecommunications service provider	1.2	0.8	1.1
Lack of time in school schedule	1.3	1.4	1.3
Lack of technical support or advice	1.7	1.2	1.6
Use of advanced telecommunications does not fit with the educational policy of this school	1.0	0.7	0.6
Lack of or inadequately trained staff	1.8	1.6	1.7
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	1.6	1.6	1.5
Not enough help for supervising student computer use	1.7	1.4	1.5
Lack of administrative support or initiative	1.3	1.1	1.0
Lack of teacher interest	1.4	1.3	0.9
Lack of parent or community interest	1.2	1.2	0.7
Lack of student interest	0.7	0.6	0.4
Funds not specifically allocated for telecommunications	1.2	1.2	1.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 15a.--Standard error of the percent of public schools currently having access to any wide area network by the extent to which various factors are barriers to upgrading or maximizing the use of their advanced telecommunication capabilities: 1994

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	2.3	1.8	2.3
Inadequate hardware upkeep and repair	2.3	1.6	1.7
Lack of instructional software	1.8	1.9	1.7
Software too complicated to use	1.9	1.6	0.8
Too few access points in building	2.1	1.5	2.2
Telecommunications equipment not easily accessible	2.4	1.9	1.9
Telecommunications links not easily accessible	1.9	1.8	2.2
Variability of telecommunications rates from service providers	1.5	1.4	1.5
Problems with telecommunications service provider	1.5	1.2	1.4
Lack of time in school schedule	1.8	1.7	2.1
Lack of technical support or advice	2.2	1.8	2.0
Use of advanced telecommunications does not fit with the educational policy of this school	1.2	1.0	0.6
Lack of or inadequately trained staff	2.1	2.3	2.0
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	1.9	2.4	2.0
Not enough help for supervising student computer use	2.4	2.0	2.0
Lack of administrative support or initiative	1.6	1.5	1.4
Lack of teacher interest	1.7	1.6	1.3
Lack of parent or community interest	1.8	1.9	0.8
Lack of student interest	1.0	0.9	0.5
Funds not specifically allocated for telecommunications	1.8	1.8	2.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Table 16a.--Standard error of the percent of public schools that do not currently have access to any wide area network by the extent to which various factors are barriers to their acquisition of advanced telecommunication capabilities: 1994

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	2.3	1.6	2.5
Inadequate hardware upkeep and repair	2.4	2.0	2.2
Lack of instructional software	2.4	2.1	2.2
Software too complicated to use	1.8	1.6	1.3
Too few access points in building	2.3	1.8	2.0
Telecommunications equipment not easily accessible	2.3	1.9	2.4
Telecommunications links not easily accessible	2.1	1.6	2.2
Variability of telecommunications rates from service providers	2.1	1.7	1.8
Problems with telecommunications service provider	1.9	1.2	1.7
Lack of time in school schedule	1.8	2.0	1.9
Lack of technical support or advice	2.7	2.0	2.2
Use of advanced telecommunications does not fit with the educational policy of this school	1.4	1.1	0.9
Lack of or inadequately trained staff	2.6	2.2	2.4
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	2.2	2.3	2.2
Not enough help for supervising student computer use	2.3	1.9	1.9
Lack of administrative support or initiative	2.0	1.7	1.3
Lack of teacher interest	2.3	2.0	1.1
Lack of parent or community interest	1.7	1.5	1.1
Lack of student interest	1.2	1.0	0.7
Funds not specifically allocated for telecommunications	1.5	1.6	2.6

SOURCE: U.S Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994.

Appendix B: Glossary of Terms

Terms Defined on the Survey Form

Advanced telecommunications - modes of communication used to transmit information from one place to another including broadcast and interactive television, networked computers, etc.

Broadcast television - network television such as NBC, CBS, etc.

Cable television - subscription television such as CNN, Learning Channel, Discovery, etc.

Closed-circuit television - the transmission of television on noncommercial lines (e.g., inhouse broadcast).

Distance learning - the transmission of information from one geographic location to another via various modes of telecommunications technology. For example, an advanced high school math class in Richmond, Virginia, could receive a college-level math seminar from the University of Virginia via two-way video.

Instructional rooms - rooms in the school building used for any instructional purposes (includes classrooms, labs, media centers, art rooms, rooms used for vocational or special education, etc.).

Local area network - the linkage of computers and/or peripherals (e.g., printer) confined to a limited area that may consist of a room, building, or campus that allows users to communicate and share information.

One-way video with two-way audio or two-way computer link - the ability to transmit or receive picture in one direction with the capability to communicate in two directions (interactively) via computer or some audio method.

Two-way video and audio - the ability to transmit and receive picture and sound simultaneously in real time.

Wide area network - a data communications linkage designed to connect computers over distances greater than the distance transmitted by local area networks (e.g., building to building, city to city, across the country, or internationally), that allows users to communicate and share information.

Terms Used in the Survey Report[2]

Archie - a research tool on the Internet for finding network host computers that have programs or data files which can be transferred to your machine.

E-mail (Electronic mail) - written messages (sending or receiving) transmitted across networks (or within the same computer) and usually accessible only by the addressee either by using an online mail user agent (mail reader) or by downloading for reading and other processing offline.

56Kb - a digital transmission speed of 56 Kilo (thousand) bits per second.

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[2]As defined in *Building the Future: K-12 Network Technology Planning Guide*, California State Department of Education; see Appendix E.

Gopher - software which permits searching files on the Internet on remote hosts using layered menus. Text from these files can be read online or the files can be transferred to your computer.

Internet - the Internet, with definite article and capital I, is a network of networks all running the TCP/IP protocols, sharing the same underlying network address space as well as the same domain name space, and interconnected into an internet.

Modem - a device which connects between a computer and a phone line to translate between the digital signal of the computer and the analog signal required for telephone transmission.

Newsgroups - electronic conferences/discussion groups similar to mailists. Newsgroup messages, called articles, are not mailed to a subscriber's e-mailbox but are distributed to a subscribing system's news server. This single copy is then accessed by all users on their network-connected machines. Each newsgroup focuses on a subject area.

PPP (Point to Point Protocol) - a protocol that allows a computer to use the TCP/IP (Internet) protocols (and become a full-fledged Internet member) with a standard telephone line and a high-speed modem. PPP is a new standard for this which replaces SLIP. Although PPP is less common than SLIP, it is quickly increasing in popularity.

SLIP (Serial Line Internet Protocol) - See PPP.

T1 rate - a digital transmission speed of 1.544 Megg (million) bits per second.

VERONICA (Very Easy Rodent-Oriented Net-wide Index to Computerized Archives) - an Internet search tool that does keyword searches of indexes of Gopher documents at FTP and Telnet sites.

Sample Universe and Classification Variables

Common Core of Data (CCD) Public School Universe - a data tape containing 85,000 records, one for each public elementary and secondary school in the 50 states, District of Columbia, and 5 outlying areas, as reported to the National Center for Education Statistics by the State Education Agencies for 1991-92. Records on this file contain the state and federal identification numbers, name, address, and telephone number of the school, county name and codes for the state, school type, enrollment size, and other selected characteristics of the school.

Instructional level

Elementary - schools beginning with grade 6 or lower, but having no grade higher than 8.

Secondary - schools with no grade lower than 7.

Combined - all other regular schools.

Metropolitan status

City - a central city of a Standard Metropolitan Statistical Area (SMSA).

Urban fringe - a place within an SMSA of a large or mid-size central city and defined as urban by the U.S. Bureau of the Census.

Town - a place not within an SMSA, but with a population greater than or equal to 2,500, and defined as urban by the U.S. Bureau of the Census.

Rural - a place with a population less than 2,500 and defined as rural by the U.S. Bureau of the Census.

Geographic region

Northeast - Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Southeast - Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

Central - Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

West - Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming.

Appendix C: Survey Methodology and Data Reliability

Sample Selection

The sampling frame for the FRSS *Survey on Advanced Telecommunications in U.S. Public Schools, K-12*, was the 1991-92 list of public schools compiled by the National Center for Education Statistics (NCES). This complete file contains about 85,000 school listings and is part of the NCES Common Core of Data (CCD) School Universe. This frame includes 57,935 regular elementary schools, 18,673 secondary schools, and 1,785 combined schools in the 50 states and the District of Columbia. All regular elementary, middle, and secondary schools in the 50 states and the District of Columbia were included in the sampling frame. Special education, vocational, and alternative/other ungraded schools, schools in the outlying territories, and schools with the highest grade level below 1st grade were excluded from the frame prior to sampling. With these exclusions, the final sampling frame consisted of approximately 78,393 eligible schools.

The sample was stratified by instructional level (elementary, secondary, combined) and by geographic region (northeast, southeast, central, and west). Within each of the major strata, schools were sorted by metropolitan status (city, urban fringe, town, rural) and minority status (less than 50 percent white enrollment, 50 to 79.9 percent white enrollment, and 80 percent or more white enrollment). The allocation of the sample to the major strata was made in a manner that was expected to be reasonably efficient for national estimates, as well as for estimates for major subclasses.

Response Rates

In October 1994, survey forms (see appendix F) were mailed to 1,502 public school principals. Principals were asked to forward the questionnaire to the computer or technology coordinator or whomever was most knowledgeable about the availability and use of advanced telecommunications at the school. The accompanying instructions indicated that the data were being obtained by telephone and requested that the respondent complete the form in preparation for the telephone interview. Twelve schools were found to be out of the scope of the study (because of closings), leaving 1,490 eligible schools in the sample. Telephone interviews were conducted from mid-October through late November with 1,380 schools completing the survey by

the end of data collection. The survey response rate was 92.6 percent (1,380 schools divided by the 1,490 eligible schools in the sample). The weighted response rate was 93.5 percent.

Sampling and Nonsampling Errors

The responses were weighted to produce national estimates. The sample weights were the inverse probability of selection adjusted for nonresponse. The findings of this report are estimates based on the sample selected and, consequently, are subject to sampling variability.

The survey estimates are also subject to nonsampling errors that can arise because of nonobservation (nonresponse or noncoverage) errors, errors of reporting, and errors made in collection of the data. These errors may result in biased data. Nonsampling errors may include such problems as the differences in the respondents' interpretation of the meaning of the questions; memory effects; misrecording of responses; incorrect editing, coding, and data entry; differences related to the particular time the survey was conducted; or errors in data preparation. While general sampling theory can be used in part to determine how to estimate the sampling variability of a statistic, nonsampling errors are not easy to measure and, for measurement purposes, usually require that an experiment be conducted as part of the data collection procedures or that data external to the study be used.

To minimize the potential for nonsampling errors, the questionnaire was pretested with school principals and computer/technology coordinators like those in the survey population. During the design of the survey and the survey pretest, an effort was made to check for consistency of interpretation of questions and terms and to eliminate ambiguous items or instructions. The questionnaire and instructions were extensively reviewed by the National Center for Education Statistics. Manual and machine editing of the questionnaire responses were conducted to check the data for accuracy and consistency. Cases with missing or inconsistent items were recontacted by telephone. Final item nonresponse ranged from 0.0 to 3.5 percent (for nearly all items, nonresponse rates were less than 1 percent). No items were imputed. All data were keyed with 100 percent verification.

Variances

The standard error is a measure of the variability of estimates due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true confidence interval. For example, the estimated percentage of schools reporting that they have access to the Internet is 35 percent, and the estimated standard error is 1.5 percentage points. The 95 percent confidence interval for the statistic extends from [35 - (1.5 times 1.96)] to [35 + (1.5 times 1.96)], or from 32.1 to 37.9 percent.

Estimates of standard errors were computed using a technique known as jackknife replication. As with any replication method, jackknife replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic (see Wolter 1985, Chapter 4; see Appendix E). To construct the replication, 40 stratified subsamples of the full sample were created and then dropped one at a time to define 40 jackknife replicates. A proprietary computer program (WESVAR), available from Westat, Inc., was used to calculate the estimates of standard errors. The software runs under IBM/OS and VAX/VMS systems.

Appendix D: Background Information

The survey was conducted under contract by Westat, Inc., using the NCES Fast Response Survey System (FRSS). Westat's Project Director was Elizabeth Farris, and the Associate Project Director and Survey Manager was Sheila Heaviside. Judi Carpenter was the NCES Project Officer. The data were requested by Linda Roberts of the U.S. Department of Education, and in coordination with Laura Breeden of the U.S. Department of Commerce and Don Gips of the Federal Communications Commission (FCC). Gerald Malitz at NCES coordinated the request for data and collaborated with Westat on the data analyses and report writing.

This report was reviewed by the following individuals:

Outside NCES

Ella Cleveland
General Accounting Office

Jill Hanson
Washington School Information Processing Cooperative

Thomas Szuba
Council of Chief State School Officers

Inside NCES

Kerry Gruber
Elementary/Secondary Education Statistics Division

Daniel Kasprzyk
Elementary/Secondary Education Statistics Division

Edith McArthur
Data Development Division

Marilyn McMillen
Elementary/Secondary Education Statistics Division

For more information about the Fast Response Survey System or the *Survey of Advanced Telecommunications in U.S. Public Schools, K-12*, contact Judi Carpenter, Elementary/Secondary Education Statistics Division, Office of Educational Research and

Appendix E: References

The WESVAR Procedures. 1989. Rockville, MD: Westat, Inc.

Wolter, K. 1985. *Introduction to Variance Estimation*. Springer-Verlag.

Building the Future: K-12 Network Technology Planning Guide. 1994. California State Department of Education, Sacramento, California.

Appendix F: Survey Form

U.S. DEPARTMENT OF EDUCATION NATIONAL CENTER FOR EDUCATION STATISTICS WASHINGTON, D.C. 20208-5651 **ADVANCED TELECOMMUNICATIONS IN U.S. PUBLIC SCHOOLS, K-12** FAST RESPONSE SURVEY SYSTEM	FORM O.M.B. NO.: 00706 EXPIRATION DATE: 6/95

This survey is authorized by law (20 U.S.C. 1221e-1). While you are not required to respond, your cooperation is needed to make the results of this survey comprehensive, accurate, and timely.

INSTRUCTIONS FOR THIS SURVEY:

This questionnaire about the availability and use of advanced telecommunications is designed to be completed by the person(s) most knowledgeable about computer and other networking (2-way audio or computer) capabilities at your school.

This study is designed to obtain information about individual schools rather than school systems. Please respond only for technologies and activities that take place in your individual school. Definitions for key terms are provided below.

DEFINITIONS

Advanced telecommunications - refers to modes of communication used to transmit information from one place to another including broadcast and interactive television, networked computers, etc.

Broadcast television - refers to network television such as NBC, CBS, etc.

Cable television - refers to subscription television such as CNN, Learning Channel, Discovery, etc.

Closed-circuit television - refers to the transmission of television on noncommercial lines (e.g., inhouse broadcast).

Distance learning - refers to the transmission of information from one geographic location to another via various modes of telecommunications technology. For example, an advanced high school math class in Richmond, Virginia, could receive a college-level math seminar from the University of Virginia via two-way video.

Instructional rooms - refers to rooms in the school building used for any instructional purposes (includes classrooms, labs, media centers, art rooms, rooms used for vocational or special education, etc.).

Local area network - refers to the linkage of computers confined to a limited area that may consist of a room, building, or campus that allows users to communicate and share information.

One-way video with two-way audio or two-way computer link - refers to the ability to transmit or receive picture in one direction with the capability to communicate in two directions (interactively) via computer or some audio method.

Two-way video and audio - refers to the ability to transmit and receive picture and sound simultaneously in real time.

Wide area network - refers to a data communications linkage designed to connect computers over distances greater than the distance transmitted by local area networks (e.g., building to building, city to city, across the country, or internationally), that allows users to communicate and share information.

AFFIX LABEL HERE

IF ABOVE INFORMATION IS INCORRECT, PLEASE MAKE CORRECTIONS DIRECTLY ON LABEL.

Name of person completing form:_____ Telephone:_____

Title/position:_____ Number of years at this school:_____

Best days and times to reach you (in case of questions):_____ E-mail:_____

IF YOU HAVE ANY QUESTIONS, CALL:

Sheila Heaviside
1-800-937-8281, ext. 8391
WESTAT
1650 Research Boulevard
Rockville, Maryland 20850

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the U.S. Department of Education, Information Management and Compliance Division, Washington, D.C. 20202-4651; and to the Office of Management and Budget, Paperwork Reduction Project 1850-0670, Washington, D.C. 20503

PLEASE REFER TO DEFINITIONS ON COVER PAGE FOR WORDS IN ITALICS.

I. Telecommunications

1. For each type of equipment or service I read, please indicate whether or not the service is available at this school, and then where in the school it is located. Then tell me the number of rooms used for any instructional purposes (include classrooms, labs and media centers, etc.) in which the equipment/service is available.

Equipment or service	1 Available at school?	2 In administrative offices?	3 In teacher workrooms?	4 In classrooms?	5 In computer labs?	6 In Library/ media centers?	7 Number of *instructional rooms* with service (Columns 4-6)
Do you have:							
a. Computer with telecommunication capabilities via *local area network*	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____
b. Computer with telecommunication capabilities via modem.....	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____
c. *Broadcast television*	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____
d. *Cable television*	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____
e. *Closed-circuit television*.....	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____
f. *Two-way video and audio* ..	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____
g. *One-way video with two-way audio or computer link*	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	_____

2. What is the total number of rooms in this school used (in whole or part) for any instructional purposes (with or without telecommunication equipment/service)? Total _____

II. Telecommunication Plans

The next few questions are about your school's telecommunication plans.

3. Is your school currently involved in the development of a comprehensive *advanced telecommunications* plan? *(Circle one.)* Yes.... 1 No.... 2

4. Does your school have plans to connect or upgrade access to a *wide area computer network*? *(Circle one.)*

a. Yes, plans to connect to *wide area network*.....1 — *If yes*, by what year do you expect to implement connection to a *wide area network*? 19____

b. Yes, plans to upgrade access to *wide area network*.....2 — *If yes*, in what year did your school first connect to a *wide area network*? 19____

c. No.....3 — *(If no, skip to Q6)*

5. Are your school's plans to implement or upgrade a *wide area network* connection part of a: *(Circle all that apply.)*

a. School plan? 1
b. District plan?..... 2
c. Regional plan? 3
d. State plan?..... 4
e. Other (*specify*)_____.... 5

III. Local Area Networking Capabilities

Next, I have a few questions about your school's local area network capabilities.

6. Does this school have a *local area network*? *(Circle one.)* Yes.... 1 No.... 2 *(If no, skip to Q9)*

7. Which of the following does your *local area network* connect for instructional and for administrative purposes? *(Circle all that apply.)*

Does it connect:	Purpose: Instructional purposes?	Purpose: Administrative purposes?	Purpose: Neither
a. Computers within the same room for	1	2	3
b. Computers in different rooms in your school building or on your school campus for	1	2	3
c. Computers in your school with a central school district computer or network for	1	2	3
d. Computers in your school with a regional (other than school district), national, or international network for	1	2	3

8. Can your school's *local area network* be reached (for either full or partial access) through telephone connections from remote locations (e.g., home or other off-campus sites) by:

	Yes	No
a. Staff?	1	2
b. Students?	1	2
c. Parents?	1	2
d. Other community members?	1	2

IV. Telecommunication Access and Use

The next set of questions concern telecommunications access and use.

9. Does this school have access to the Internet? *(Circle one.)* Yes.... 1 No.... 2 *(If no, skip to Q12)*

10. Please tell me which of the following Internet resources or capabilities your school has and who in your school has access to each. *(Circle all that apply.)*

Resource/capability	Not available?	Available for administrative staff?	Available for teachers?	Available for students?
Is/Are:				
a. E-mail	1	2	3	4
b. News groups	1	2	3	4
c. Resource location services (e.g., Gopher, Archie, Veronica, etc.)	1	2	3	4
d. Graphical user interface (e.g., MOSAIC)	1	2	3	4
e. Other (*specify*)_____	1	2	3	4

11. How many rooms used for instructional purposes (include classrooms, labs and media centers, etc.) have connections to the Internet? _____

12. Does this school have access to other *wide area networks* such as CompuServe, America Online, Prodigy, etc? *(Circle one.)* Yes..... 1 No..... 2

(If no to Q9 and Q12, skip to Q23.)

13. How does your school connect to *wide area networks* (e.g., Internet, etc.)? *(Circle all that apply.)*
By:

Modem?	1	SLIP/PPP connection?	4
TI?	2	Other? (*specify*_____)	5
56Kb?	3		

14. Who has responsibility for administering the *wide area network* in your school? *(Circle one.)*

a. A full-time network administrator (staff member whose primary responsibility is network administration)..... 1

b. A staff member with part-time responsibility for administering the network..... 2

c. Administered by the district..... 3

d. No single individual..... 4 *(Skip to Q16)*

15. Is this network administrator on site or shared with one or more schools? *(Circle one.)*

On site.... 1 Shared with other schools.... 2

16. Please indicate for whom *wide area network* training is available and who provides this training. *(Circle all that apply for each item.)*

	Is training provided for (a-d) by the:			
	Not available	**School?**	**District?**	**Community?**
a. Administrative staff	1	2	3	4
b. Teachers	1	2	3	4
c. Students	1	2	3	4
d. Parents	1	2	3	4

17. To what extent do administrative staff, teachers, and students use *wide area networks* in your school?

	Does/do (a-c) use wide area networks to a:			
	Not at all	**Small extent?**	**Moderate extent?**	**Large extent?**
a. Administrative staff	1	2	3	4
b. Teachers	1	2	3	4
c. Students	1	2	3	4

18. Now I'll read a list of possible restrictions on student access to *wide area networks*. Please tell me which restrictions to student access apply to your school? (*Circle all that apply*)

a. No students have access..... 1

b. All students have access..... 2

c. Network access is restricted to specific grades..... 3

d. Network access is restricted to those students currently enrolled in or having completed a computer course..... 4

e. Network access is restricted to students in specific programs (e.g., gifted and talented, vocational education, etc.).. 5

f. Other (*specify*)_____.... 6

19. Approximately what percentage of all (administrative staff/teachers/students) in your school access *wide area networks* from school:

	Not at all?	Less than once a month?	Once or twice a month?	More than twice a month?
a. Administrative staff	_____%	_____%	_____%	_____%
b. Teachers	_____%	_____%	_____%	_____%
c. Students	_____%	_____%	_____%	_____%

20. In which of the following ways are *wide area networking* capabilities and other *advanced telecommunications* used in your school?

	Are wide area computer networks used for:		Are other advanced telecommunications used for:	
	Yes	No	Yes	No
a. Central record keeping within school district?	1	2		
b. Accessing other networks for sharing files and programs?	1	2		
c. As part of an integrated learning system providing individualized assignments?	1	2	1	2
d. To work from home?	1	2	1	2
e. *Distance learning*?	1	2	1	2
f. Other? *(specify)*_____	1	2	1	2

21. Please tell me to what extent each of the groups I read have a formal role in developing your school's telecommunications activities?

Would you say (a-i) have a formal role to a:	Not at all	Small extent?	Moderate extent?	Large extent?
a. Students	1	2	3	4
b. Teachers/Staff	1	2	3	4
c. Parents	1	2	3	4
d. District/Regional administrators	1	2	3	4
e. Business leaders	1	2	3	4
f. Institutions of higher education	1	2	3	4
g. Other community organizations (e.g., libraries)	1	2	3	4
h. State education agency	1	2	3	4
i. Other (*specify*) _____	1	2	3	4

22. Who is responsible for making decisions concerning your school's *advanced telecommunications* budget? *(Circle all that apply.)*

School?	1
District?	2
Regional administrator?	3
State?	4

V. Barriers

23. Please indicate to what extent, if any, each of the following are barriers to your school's acquisition or usage of *advanced telecommunications* capabilities. If your school is currently using *advanced telecommunications*, please indicate to what extent the following are barriers to upgrading or maximizing telecommunications usage.

IS:	Not a barrier	A minor barrier	A moderate barrier	A major barrier
a. Lack of or poor equipment	1	2	3	4
b. Inadequate hardware upkeep and repair	1	2	3	4
c. Too few access points in building	1	2	3	4
d. Problems with telecommunications service provider	1	2	3	4
e. Lack of instructional software	1	2	3	4
f. Software too complicated to use	1	2	3	4
g. Lack of time in school schedule	1	2	3	4
h. Telecommunications links not easily accessible	1	2	3	4
i. Telecommunications equipment not easily accessible	1	2	3	4
j. Lack of technical support or advice	1	2	3	4
k. Lack of administrative support or initiative	1	2	3	4
l. Lack of or inadequately trained staff	1	2	3	4
m. Lack of teacher interest	1	2	3	4
n. Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	1	2	3	4
o. Lack of student interest	1	2	3	4
p. Lack of parent or community interest	1	2	3	4
q. Not enough help for supervising student computer use	1	2	3	4
r. Funds not specifically allocated for telecommunications	1	2	3	4
s. Variability of telecommunications rates from service providers	1	2	3	4
t. Use of *advanced telecommunications* does not fit with the educational policy of this school	1	2	3	4

VI. General Questions About Your School

24. Looking back over the past 3-5 years, what type of an effect would you say using each of the following *advanced telecommunications* tools has had on your school overall?

Has the effect of:	Not not used	Been very positive?	Been somewhat positive?	Had no impact?	Been somewhat negative?	Been very negative?
a. Computer networks	1	2	3	4	5	6
b. *Broadcast television*	1	2	3	4	5	6
c. *Cable television*	1	2	3	4	5	6
d. *Closed-circuit television*	1	2	3	4	5	6
e. *Two-way video and audio*	1	2	3	4	5	6
f. *One-way video with two-way audio or computer link*	1	2	3	4	5	6

25. In what year was this school built? 19_____ Last major renovation? 19_____

26. Did the construction or renovation include wiring for telecommunication services? *(Circle one.)* Yes..... 1 No..... 2

THANK YOU!

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